

We claim:

1. A slurry loop reactor containing a flow of slurry therein, comprising:

5 a discharge conduit extending a distance into the loop reactor;

the conduit having a longitudinal axis and an opening inside the loop reactor;

10 at least a portion of the conduit being curved along its longitudinal axis inside the loop reactor; and

the opening substantially facing the flow of the slurry.

2. The loop reactor according to claim 1, wherein the discharge conduit is located within a curved portion of the loop reactor.

15 3. The loop reactor according to claim 2, wherein the curved portion of the loop reactor comprises a lower leg of the loop reactor.

4. The loop reactor according to claim 2, wherein the discharge conduit is located within a middle portion of the curved portion of the loop reactor.

20 5. The loop reactor according to claim 3, wherein the discharge conduit is located within a middle portion of the curved portion of the loop reactor.

6. The loop reactor according to claim 2, wherein the discharge conduit is located substantially at the middle of the curved portion of the loop reactor.

25 7. The loop reactor according to claim 3, wherein the discharge conduit is located substantially at the middle of the curved portion of the loop reactor.

8. The loop reactor according to claim 4, wherein the discharge conduit is located substantially at the middle of the curved portion of the loop reactor.

30 9. The loop reactor according to claim 2, wherein the curved portion comprises a 20 to 270 degree bend.

10. The loop reactor according to claim 3, wherein the curved portion comprises a 20 to 270 degree bend.

11. The loop reactor according to claim 7, wherein the curved portion comprises a 20 to 270 degree bend.

12. The loop reactor according to claim 2, wherein the curved portion comprises a 80 to 200 degree bend.

5 13. The loop reactor according to claim 3, wherein the curved portion comprises a 80 to 200 degree bend.

14. The loop reactor according to claim 7, wherein the curved portion comprises a 80 to 200 degree bend.

10 15. The loop reactor according to claim 2, wherein the curved portion comprises a 90 to 180 degree bend.

16. The loop reactor according to claim 3, wherein the curved portion comprises a 90 to 180 degree bend.

17. The loop reactor according to claim 7, wherein the curved portion comprises a 90 to 180 degree bend.

18. The loop reactor according to claim 2, wherein the curved portion comprises a 180 degree bend.

19. The loop reactor according to claim 3, wherein the curved portion comprises a 180 degree bend.

20 20. The loop reactor according to claim 7, wherein the curved portion comprises a 180 degree bend.

21. The loop reactor according to claim 1, wherein the discharge conduit is curved along its longitudinal axis from about 45 degrees to about 135 degrees.

25 22. The loop reactor according to claim 2, wherein the discharge conduit is curved along its longitudinal axis from about 45 degrees to about 135 degrees.

23. The loop reactor according to claim 3, wherein the discharge conduit is curved along its longitudinal axis from about 45 degrees to about 135 degrees.

30 24. The loop reactor according to claim 1, wherein the discharge conduit is curved along its longitudinal axis from about 75 degrees to about 135 degrees.

25. The loop reactor according to claim 2, wherein the discharge conduit is curved along its longitudinal axis from about 75 degrees to about 135 degrees.

5 26. The loop reactor according to claim 3, wherein the discharge conduit is curved along its longitudinal axis from about 75 degrees to about 135 degrees.

27. The loop reactor according to claim 1, wherein the face of the opening defines a plane which intersects an outside wall of the loop reactor at a tangent line which is substantially perpendicular to the plane.

10 28. The loop reactor according to claim 2, wherein the face of the opening defines a plane which intersects an outside wall of the loop reactor at a tangent line which is substantially perpendicular to the plane.

15 29. The loop reactor according to claim 3, wherein the face of the opening defines a plane which intersects an outside wall of the loop reactor at a tangent line which is substantially perpendicular to the plane.

30. The loop reactor according to claim 4, wherein the face of the opening defines a plane which intersects an outside wall of the loop reactor at a tangent line which is substantially perpendicular to the plane.

20 31. The loop reactor according to claim 6, wherein the face of the opening defines a plane which intersects an outside wall of the loop reactor at a tangent line which is substantially perpendicular to the plane.

32. The loop reactor according to claim 9, wherein the face of the opening defines a plane which intersects an outside wall of the loop reactor at a tangent line which is substantially perpendicular to the plane.

25 33. The loop reactor according to claim 13, wherein the face of the opening defines a plane which intersects an outside wall of the loop reactor at a tangent line which is substantially perpendicular to the plane.

34. The loop reactor according to claim 18, wherein the face of the opening defines a plane which intersects an outside wall of the loop reactor at a tangent line which is substantially perpendicular to the plane.

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35. The loop reactor according to claim 1, wherein the discharge conduit has a diameter which is about 5-40% of the inside diameter of the loop reactor.

5 36. The loop reactor according to claim 2, wherein the discharge conduit has a diameter which is about 5-40% of the inside diameter of the loop reactor.

37. The loop reactor according to claim 3, wherein the discharge conduit has a diameter which is about 5-40% of the inside diameter of the loop reactor.

10 38. The loop reactor according to claim 4, wherein the discharge conduit has a diameter which is about 5-40% of the inside diameter of the loop reactor.

15 39. The loop reactor according to claim 6, wherein the discharge conduit has a diameter which is about 5-40% of the inside diameter of the loop reactor.

40. The loop reactor according to claim 1, wherein the discharge conduit has a diameter which is about 7-25% of the inside diameter of the loop reactor.

20 41. The loop reactor according to claim 2, wherein the discharge conduit has a diameter which is about 7-25% of the inside diameter of the loop reactor.

42. The loop reactor according to claim 3, wherein the discharge conduit has a diameter which is about 7-25% of the inside diameter of the loop reactor.

25 43. The loop reactor according to claim 4, wherein the discharge conduit has a diameter which is about 7-25% of the inside diameter of the loop reactor.

44. The loop reactor according to claim 6, wherein the discharge conduit has a diameter which is about 7-25% of the inside diameter of the loop reactor.

45. The loop reactor according to claim 1, wherein the discharge conduit has a diameter which is about 8-15% of the inside diameter of the loop reactor.

5 46. The loop reactor according to claim 2, wherein the discharge conduit has a diameter which is about 8-15% of the inside diameter of the loop reactor.

47. The loop reactor according to claim 3, wherein the discharge conduit has a diameter which is about 8-15% of the inside diameter of the loop reactor.

10 48. The loop reactor according to claim 4, wherein the discharge conduit has a diameter which is about 8-15% of the inside diameter of the loop reactor.

15 49. The loop reactor according to claim 6, wherein the discharge conduit has a diameter which is about 8-15% of the inside diameter of the loop reactor.

50. The loop reactor according to claim 1, wherein the opening is located inside the loop reactor at a point where the concentration of solids of the slurry is higher than the average concentration of solids in the slurry in the loop reactor.

20 51. The loop reactor according to claim 50, wherein the opening is located closer to the outside wall of the loop reactor than to the inside wall of the loop reactor.

25 52. The loop reactor according to claim 51, wherein the opening is located closer to an outside wall of the loop reactor than to the center of the loop reactor.

53. The loop reactor according to claim 52, wherein the opening is closely adjacent to the outside wall of the loop reactor.

54. The loop reactor according to claim 53, wherein the opening touches the outside wall of the loop reactor.

30 55. A slurry loop reactor containing a flow of slurry therein, comprising:

a discharge conduit extending a distance into the loop reactor;

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the conduit having a longitudinal axis and an opening inside the loop reactor;

at least a portion of the conduit being curved along its longitudinal axis; and

the opening substantially facing the flow of the slurry;

the discharge conduit being located substantially at the middle of a curved portion of the loop reactor;

the curved portion of the loop reactor comprising a lower leg of the loop reactor;

the curved portion of the loop reactor comprising a 180 degree bend;

the discharge conduit being curved along its longitudinal axis more than about 75 degrees but less than about 135 degrees;

the face of the opening defining a plane which intersects an outside wall of the loop reactor at a tangent line being substantially perpendicular to the plane;

the discharge conduit having a diameter which is about 8-15% of the inside diameter of the loop reactor; and

the opening is closer to the outside half wall than the center line of the loop reactor.

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